

## **Appendix D – Groundwater Modelling Report (NTEC Environmental Technology)**

## Memorandum

To: Greg Watts, MDW Environmental Services

From: Lynn Reid

Subject: Groundwater modelling for the Wasterock Hazelland Landfill site in Hazelmere, Western Australia

Date: 24 September 2012

This memo describes groundwater modelling performed by NTEC Environmental Technology (“NTEC”) for MDW Environmental Services (“MDWES”) who are working on behalf of Wasterock Pty Ltd. Modelling of groundwater flow near the Hazelland Landfill site in Hazelmere has been performed as part of a hydrogeological investigation to support an application for a 5C Licence to Extract Groundwater. The objective of NTEC’s work is to provide an estimate of the impact of proposed abstraction on nearby pre-existing groundwater users.

### 1. SITE BACKGROUND

The site is an industrial lot on Adelaide Street in Hazelmere, Western Australia, located approximately 6 km east of the Swan River and approximately 1 km west of the Darling Fault. The site is located in the Shire of Swan South groundwater subarea (Water Register, 2012), adjacent to the Shire of Kalamunda groundwater subarea. Detailed groundwater water quality investigations have been performed at the site by MDWES (MDW Environmental Services, 2012). The site is listed on the DEC Contaminated Sites Database (SLIP, 2012).

The site’s surficial geology is Bassendean Sands (Perth Groundwater Atlas, 2012), with low-lying areas to the west near the Perth Airport having swamp and lacustrine deposits at the surface. Colluvium lies to the east, at the edge of the Darling Fault, and Precambrian basement rock exists to the east of the Fault. Further north and west, the surface geology is Guildford Clay.

Hydrogeologically at the site and nearby, the uppermost aquifer is the unconfined Superficial Swan (Water Register, 2012), with the Leederville and Yarragadee North aquifers underlying the Superficial. Ground elevations at the site are approximately 30 to 35 mAHD (Perth Groundwater Atlas, 2012), decreasing gently to the west-northwest and increasing rapidly to the east of the Darling Fault. The base of the Superficial Aquifer is mapped (Perth Groundwater Atlas, 2012) at approximately 5 to 7 mAHD at the site. The base slopes upward towards the Darling Fault, and

downward towards the west. In the site region, the Superficial Aquifer has a thickness of between 10 and 25 m (Davidson & Wu, 2006).

The water table elevation with the Superficial Aquifer generally follows the topography but may intersect the land surface (Davidson & Wu, 2006) as evidenced by marshy conditions at the Perth Airport to the west of the site. Classified Multiple Use geomorphic wetlands are located less than 1 km west of the site. The Perth Groundwater Atlas suggests that the water table in the Superficial Aquifer at the site lies at approximately 15 mAHD. However, six surveyed monitoring bores (MDW Environmental Services, 2012) were measured in May 2012 and indicate water levels from 19.2 to 23.6 mAHD. Based on these measurements, the hydraulic gradient in the Superficial Aquifer at the site is approximately 0.01, with groundwater flux moving towards the northwest.

Regional studies (Davidson & Wu, 2006) suggest that the rate of groundwater flow through the Superficial Aquifer ranges from less than 50 m/yr to more than 1000 m/yr, with the lower value more likely in the site area.

The nearest WIN data site with historical groundwater monitoring data is 61610508, over 8 km away. Water levels fluctuate at this location by up to 2.8 m over the years 2000-2013, and are generally declining from 1970 onwards.

The Superficial Aquifer is recharged by rainfall. Modelling by the Department of Water (Xu et al., 2008) suggested that the net rainfall recharge to the Bassendean Sands is approximately 192 mm per year. At the site, the Superficial Aquifer is expected to be generally in equilibrium with the underlying aquifers (Davidson & Wu, 2006).

## **2. NEARBY GROUNDWATER USERS**

A search was performed by MDWES on 16 April 2012 for existing groundwater abstraction licenses within a 5 km radius of the site. The Department of Water provided the list shown in the Appendix: Groundwater licensees. There are nine groundwater licenses granted with a 1.5 km radius of the centre of the site. Three licenses (GWL000061690(002), GWL000110971(002), and GWL000152680(003)) are north of Adelaide Street, while six locations (GWL000074457(003), GWL000153812(001), three under GWL 000158077 (005), GWL000167041(001), GWL169011(003)) are located south of Adelaide Street and north of Kalamunda Road. All of these licenses are for abstraction from the Perth – Superficial Swan Aquifer except for GWL000110971(002) which is drawing from the Perth – Leederville Aquifer.

A 10.3 ha conservation area (Bush Forever site 122, Government of Western Australia, 2000) is located adjacent to the property, south of Adelaide Street. While this site has not been identified as a groundwater dependent ecosystem, it is

suggested to be a Flora conservation area for plant communities representative of the eastern Swan Coastal Plain.

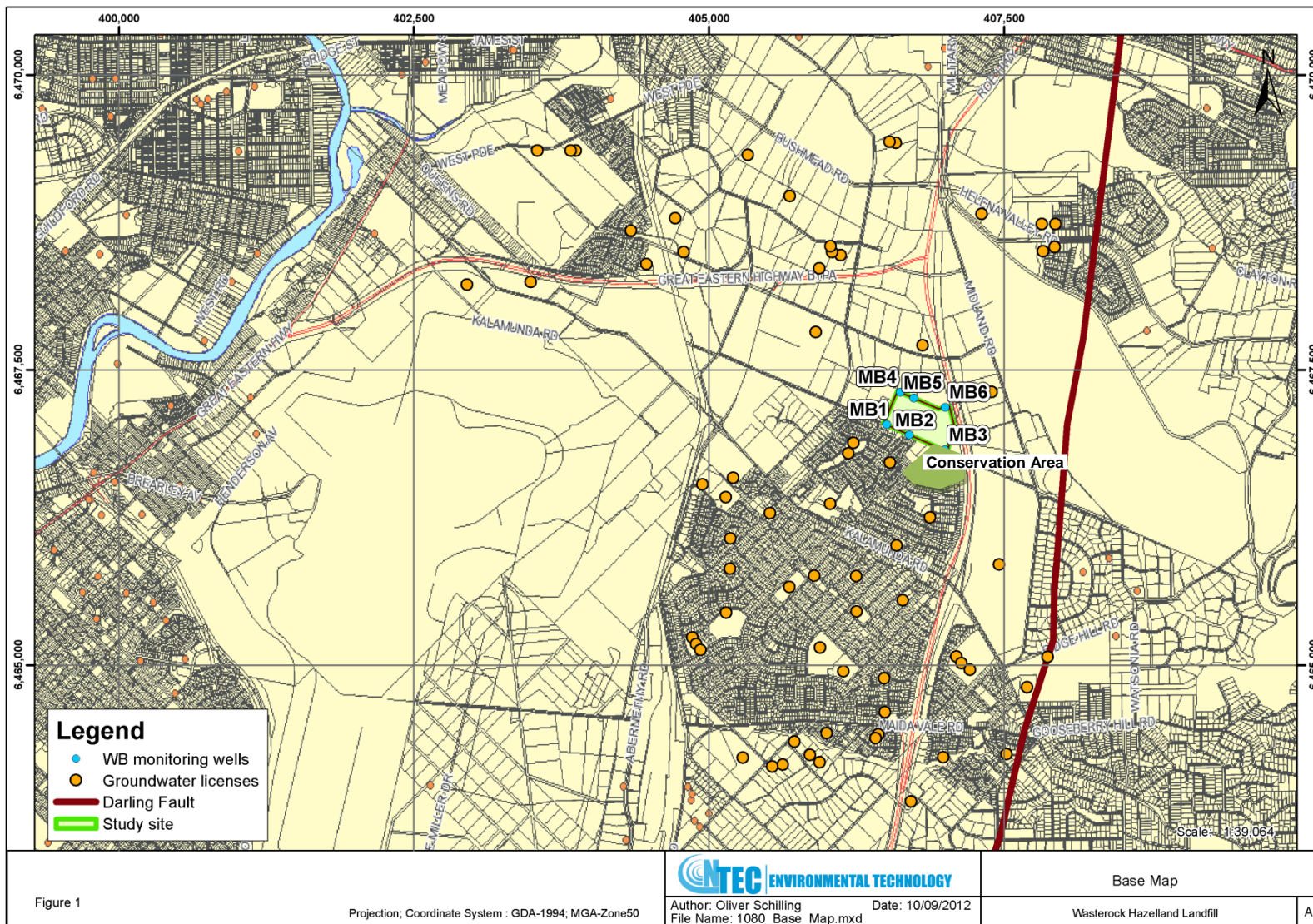
The regional area of the site, nearby groundwater licenses, the site details, and the extent of the numerical model are shown in Figure 1. The proposed abstraction bore will be located within the site boundaries.

### **3. SIMPLIFIED GROUNDWATER MODEL**

A simplified numerical model of the groundwater regime was developed to estimate drawdown caused by the proposed abstraction at the Site. As a full hydrogeologic assessment has not been performed, the numerical model produces differential results and estimates the impact of the proposed abstraction.

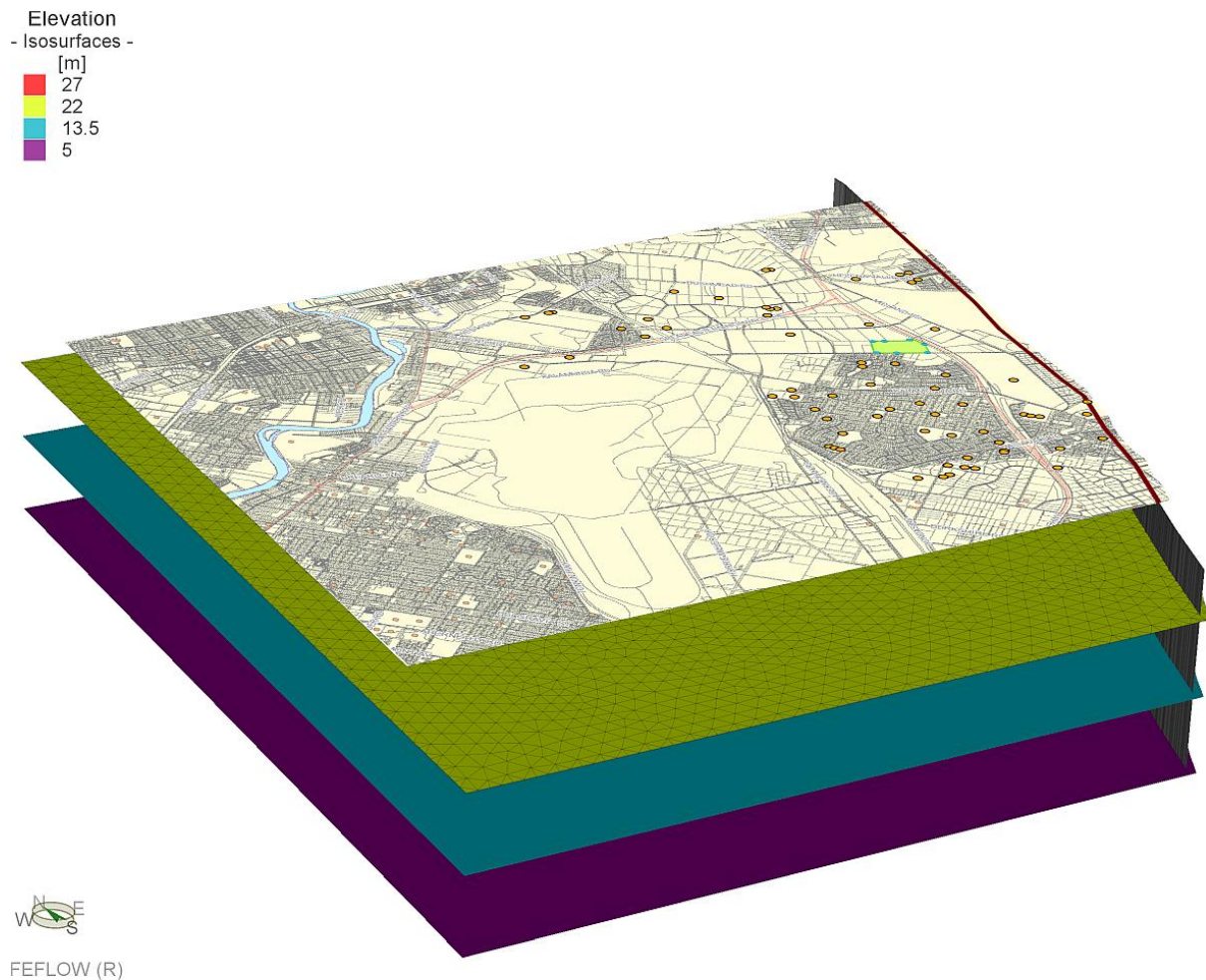
Conceptually, the model consists of the Superficial Aquifer in the region around the site. The unconfined aquifer is assumed to be homogeneous, with a horizontal ground surface at 27 mAHD, a horizontal water table at 22 mAHD, and a horizontal base of the Superficial Aquifer at 5 mAHD for a total model depth of 22 m and a saturated thickness of 17 m. No connection to the underlying aquifers is allowed, and all horizontal boundaries of the model are presumed impervious. No net rainfall recharge is added to the model, providing conservative over-estimates of the impact of the pumping.

The modelling was performed with FEFLOW (Diersch, 2005), a finite element groundwater modelling package. The model grid covers 11.6 km by 10.3 km horizontally and has three layers, with a total of 28908 mesh elements and 19860 mesh nodes. The triangular mesh has finer resolution around the site. Figure 2 shows the layout of the model with an area map superimposed.



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**Figure 1: Location of the Wasterock Hazelland landfill site. The model area encompasses the entire map.**



**Figure 2: Initial layout of numerical model showing extent of domain and Darling Fault to the east. The Site is shown in green on the top map. The regional grid spacing is shown on the second slice; finer resolution exists near the Site. Vertical exaggeration 100x.**

The model was populated with horizontal and vertical hydraulic conductivity and specific yield values derived from the PRAMS model (Davidson and Yu, 2006) for the region around the site. The values used and the data sources are noted below in Table 1.

Abstraction was represented with a single pumping bore located in the south-west corner of the site. Since the model is flat-lying, the location of the modelled bore will not significantly alter results, except where drawdown is impacted by the proximity of the Darling Fault. The bore was screened at the bottom of the model, representing pumping from near the base of the Superficial Aquifer. Pumping rates were 300 ML/yr, or 821.3 m<sup>3</sup>/day. Pumping was assumed to continue for three years; the model was run for a further 10 years to simulate the results of groundwater recovery.

**Table 1: Parameters used in Hazelland impact model. All data values derived from Cymod Systems Pty Ltd (2009).**

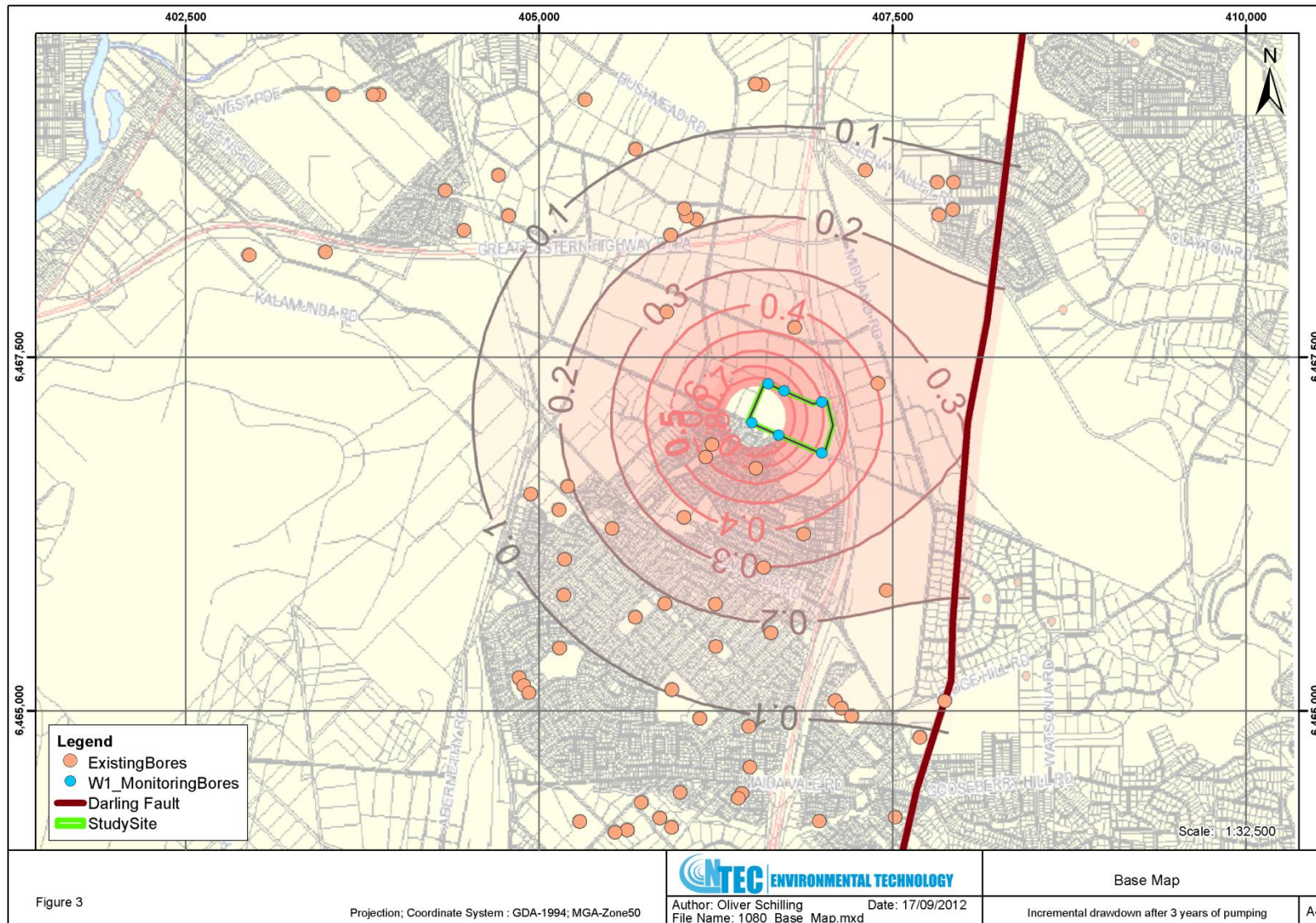
Parameter	Units	Value	Source (see caption)
Hydraulic conductivity, horizontal	m/day	20.0	Average for Bassendean Sands, also Figure B1 near the Site.
Hydraulic conductivity, vertical	m/day	0.75	Figure B16 for Bassendean Sands near the site
Specific yield	-	0.20	Figure B27 for Bassendean Sands near the Site

## 4. MODELLING RESULTS

Modelled drawdown after 3 years pumping is shown at the water table in Figure 3. The monitoring bore closest to the pumping site, MB1, would experience a drawdown of 1.40 m. The drawdown contour of 0.2 m extends approximately 1.6 km from the modelled pumping bore.

Since the precise geographic locations for nearby groundwater users are not available, it is not possible to quantify impacts for these users. However, based on the Water Register (2012) map, twelve licensed groundwater bores may have drawdown impacts of up to 0.2 m. Three licensees will have impacts of more than 0.6 m, and five licensees will have impacts up to 0.3 m. An additional twenty-three licensed locations may have impacts of more than 0.1 m based on these modelling results.

The conservation area has monitoring bore MB3 near its northern boundary. At MB3, water table drawdown is predicted to be 0.56 m. All of the conservation area lies within the 0.4 m drawdown contour after three years of abstraction.



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**Figure 3: Drawdown after 3 years of abstraction.**

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Additional maps are shown for the recovery of the aquifer after pumping ceases. Figure 4 shows the drawdown 1, 2, 5, and 10 years after pumping ends. The rapid recovery of the aquifer after the cessation of pumping indicates that the aquifer is not significantly impacted in the long term by the proposed three years of abstraction. The water table recovers and the impact is negligible after ten years. However, because this simplified model does not include rainfall recharge, the numerical model can never reach equilibrium at the original water table height.

## 5. CONCLUSIONS

A three-dimensional numerical model of the region around the Wasterock Hazelland landfill site has been developed. The model is suitable for determining the incremental effect of the proposed 300 ML/yr abstraction, given the assumptions of simplified geometry and boundary conditions. No rainfall recharge has been assumed, which generates conservative “worst-case” assumptions for this model configuration.

Modelling results indicate that after three years, the proposed abstraction will induce up to 0.7 m of additional drawdown off the site at nearby previously existing licensed groundwater users or conservation areas. These results are dependent upon the assumed location of the pumping bore, and could be altered by modifying the location of this modelled bore. Groundwater levels would be expected to recover rapidly. Five years after the cessation of pumping, the modelled drawdown is less than 0.2 m at all locations.

The modelling efforts provide a “first look” at the projected effects of the proposed abstraction application, and could be made more precise by considering the effects of variable aquifer thickness, regional groundwater flux, and rainfall recharge.

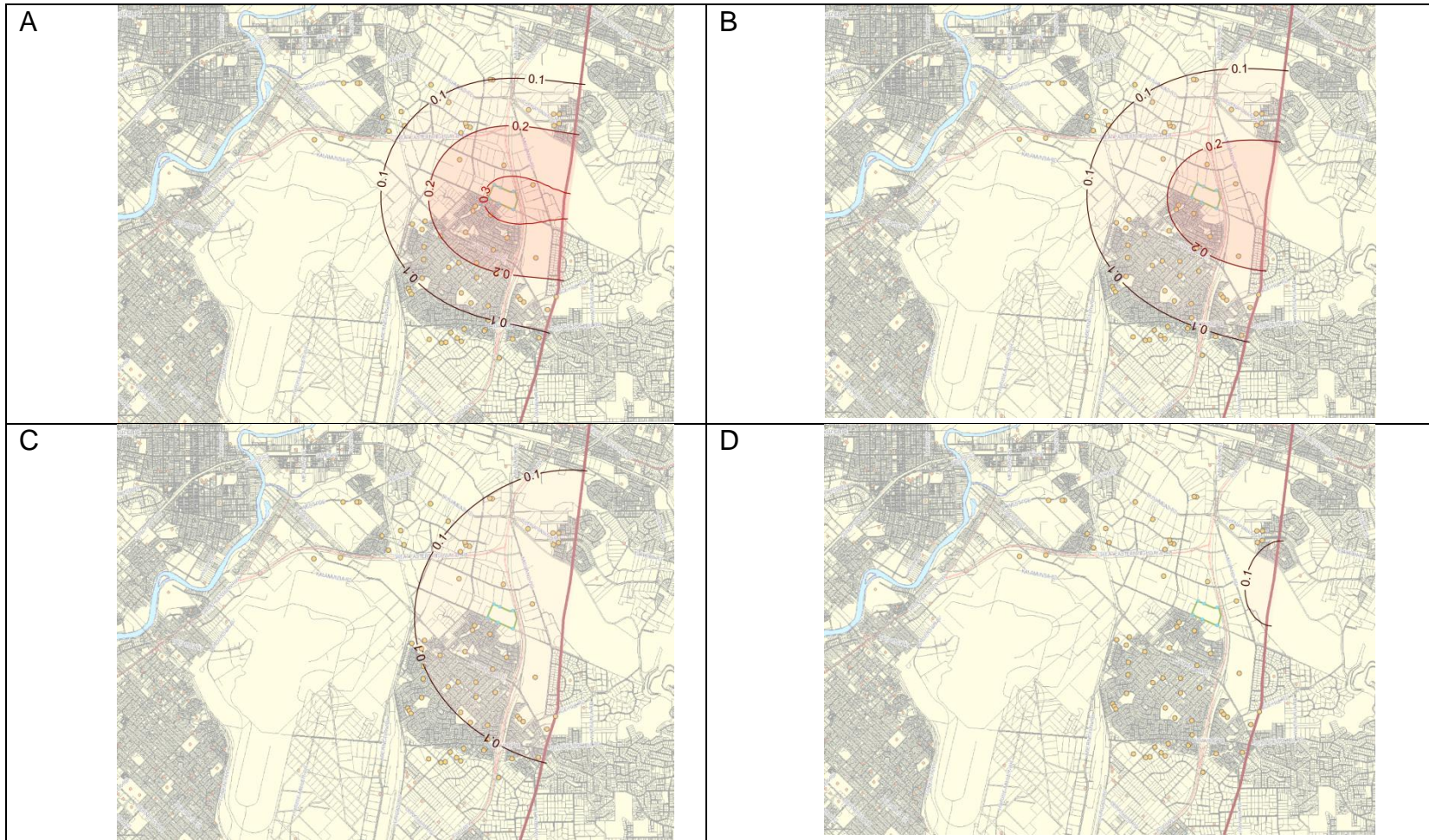


Figure 4: Drawdown recovery (A) one (B) two (C) five and (D) ten years after pumping ceases

## 6. REFERENCES

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## APPENDIX: GROUNDWATER LICENSEES

Data in this appendix was provided to MDW Environmental Services by the Department of Water database at 13:45 hours on 16 April 201 by extracting licenses within a 5 kilometre radius of the Site. The properties nearest the Site are highlighted below, with green representing properties north of Adelaide Street and blue properties south of Adelaide Street and north of Kalamunda Road.

Instrument Version	Licence Allocation (kL)	GW Area	Sub Area	Aquifer	All Parties	Property	Issue Date	Expiry Date
GWL 000041225 (002)	3000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Salama, Amir	6, SULTANA RD, FORRESTFIELD	2/06/2004	1/06/2014
GWL 000045890 (003)	97500	Perth	City of Belmont	Perth - Superficial Swan	Westralia Airports Corporation Pty Limited	0, Horrie Miller Drive, Cloverdale	2/06/2004	1/06/2014
GWL 000047420 (002)	3650	Swan	South Swan	Perth - Mirrabooka	Smith, Graeme McDonald	2, HAMERSLEY RD, CAVERSHAM	22/01/2004	21/01/2014
GWL 000048642 (003)	21000	Perth	Perth South Confined	Perth - Leederville.	La Salle College	14, MURIEL ST, MIDDLE SWAN	30/03/2010	25/03/2014
GWL 000048834 (003)	35550	Swan	South Swan	Perth - Mirrabooka	Bond, Robert James	10, HAMERSLEY RD, CAVERSHAM	6/07/2011	6/07/2021
GWL 000048834 (003)	35550	Swan	South Swan	Perth - Mirrabooka	Bond, Robert James	Lots 2976 & 10 Hamersley Road, Caversham.	6/07/2011	6/07/2021
GWL 000048839 (003)	33750	Perth	Shire of Swan South	Perth - Superficial Swan	Swan Tafe	Lot 50 Lloyd Street, Midland.	21/04/2010	1/06/2014
GWL 000051642 (002)	2250	Perth	Shire of Swan South	Perth - Superficial Swan	BGC (Australia) Pty Ltd	Lot 3 Bushmead Road Hazelmere	9/11/2004	9/11/2014
GWL 000053269 (002)	4800	Perth	Shire of Swan South	Perth - Superficial Swan	Swan Bowling & Recreation Club (Inc)	9, JAMES ST, GUILDFORD	3/02/2005	3/02/2015
GWL 000056782 (002)	6250	Perth	Shire of Kalamunda	Perth - Superficial Swan	Smith, S M; Smith, B	113, SULTANA RD, MAIDA VALE	21/04/2004	19/04/2014
GWL 000058650 (002)	27000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Swanview Plant Farm Pty Ltd	Lot 399 Sorenson Road High Wycombe	2/11/2006	1/11/2016
GWL 000059059 (003)	15000	Perth	Shire of Swan South	Perth - Superficial Swan	St Brigid's School	67, TOODYAY RD, MIDDLE SWAN	30/03/2010	21/12/2016
GWL 000060942 (003)	46150	Perth	Shire of Kalamunda	Perth - Superficial Swan	Seventh-Day Adventist Church (Western Australian Conference) Limited	1, KALAMUNDA RD, MAIDA VALE	20/04/2010	13/03/2018
GWL 000060942 (003)	46150	Perth	Shire of Kalamunda	Perth - Superficial Swan	Seventh-Day Adventist Church (Western Australian Conference) Limited	1, KALAMUNDA RD, MAIDA VALE	20/04/2010	13/03/2018
GWL 000061690 (002)	20000	Perth	Shire of Swan South	Perth - Superficial Swan	Pioneer Road Services Pty Ltd	1, VALE RD, HAZELMERE	10/01/2008	10/01/2018
GWL 000062528 (003)	20625	Perth	Shire of Swan South	Perth - Superficial Swan	La Salle College	79, MURIEL ST, MIDDLE SWAN	30/03/2010	25/03/2014
GWL 000062635 (003)	15750	Perth	Shire of Swan South	Perth - Superficial Swan	The Roman Catholic Archbishop of Perth		20/05/2010	8/10/2018

GWL 000063196 (002)	3260	Perth	Shire of Kalamunda	Perth - Superficial Swan	Department of Agriculture and Food	11858, BOUGAINVILLEA AV, FORRESTFIELD	14/10/2008	14/10/2018
GWL 000063807 (003)	89390	Perth	Shire of Kalamunda	Perth - Superficial Swan	Bacchion, David	22, DUNDAS RD, HIGH WYCOMBE	15/10/2009	15/10/2019
GWL 000063807 (003)	89390	Perth	Shire of Kalamunda	Perth - Superficial Swan	Bacchion, David	23, MILNER RD, HIGH WYCOMBE	15/10/2009	15/10/2019
GWL 000063807 (003)	89390	Perth	Shire of Kalamunda	Perth - Superficial Swan	Bacchion, David	551, DUNDAS RD, HIGH WYCOMBE	15/10/2009	15/10/2019
GWL 000064694 (003)	24000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Matthew Gibney Catholic Primary School; The Roman Catholic Archbishop of Perth	2, MUNDAY RD, HIGH WYCOMBE	30/03/2010	15/12/2018
GWL 000074457 (003)	196250	Perth	Shire of Kalamunda	Perth - Superficial Swan	Hillview Public Golf Course Pty Ltd	Location 7652 Kalamunda Road Maida Vale	4/05/2010	31/07/2019
GWL 000074457 (003)	196250	Perth	Shire of Kalamunda	Perth - Superficial Swan	Hillview Public Golf Course Pty Ltd	Location 7652 Kalamunda Road Maida Vale	4/05/2010	31/07/2019
GWL 000098956 (003)	15550	Perth	Shire of Swan South	Perth - Superficial Swan	Swick, Randal Lloyd	12, STIRLING CR, HAZELMERE	14/05/2010	14/05/2020
GWL 000099004 (008)	17250	Perth	Perth South Confined	Perth - Leederville.	Midland Redevelopment Authority	9011, YELVERTON DR, MIDLAND	12/04/2011	31/12/2014
GWL 000101500 (002)	66000	Perth	Perth South Confined	Perth - Leederville.	Derby Industries Pty Ltd	115, LAKES RD, HAZELMERE	11/11/2010	11/11/2020
GWL 000101500 (002)	66000	Perth	Perth South Confined	Perth - Leederville.	Derby Industries Pty Ltd	114, LAKES RD, HAZELMERE	11/11/2010	11/11/2020
GWL 000103034 (007)	28500	Perth	Shire of Swan South	Perth - Superficial Swan	Di Giuseppe, Antonio Giuseppe	25, STIRLING CR, HAZELMERE	2/08/2010	11/11/2012
GWL 000103896 (005)	8500	Perth	Shire of Swan South	Perth - Superficial Swan	Austral Bricks (WA) Pty Ltd	1, MILITARY RD, MIDLAND	4/03/2011	4/03/2021
GWL 000108239 (002)	16600	Perth	Shire of Swan South	Perth - Superficial Swan	Bynon, William John	2, ARUM LILY PL, HAZELMERE	3/07/2003	3/07/2013
GWL 000108850 (002)	1500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Powell, Baden Jones	148, ALMONDTREE L, MAIDA VALE	9/09/2010	10/09/2020
GWL 000110971 (002)	29250	Perth	Perth South Confined	Perth - Leederville.	The Trustee For C & S Bucolo Family Trust	15, MIDLAND RD, HAZELMERE	10/05/2002	9/05/2012
GWL 000111079 (002)	4800	Perth	Shire of Mundaring	Perth - Superficial Swan	Shire of Mundaring	13293, , MIDVALE	30/03/2010	17/07/2012
GWL 000151552 (001)	15750	Perth	Shire of Swan South	Perth - Mirrabooka	Westrac Equipment Pty Ltd	50, GREAT EASTERN HWY, SOUTH GUILDFORD	26/11/2002	26/11/2012
GWL 000151578 (001)	7950	Perth	Shire of Kalamunda	Perth - Superficial Swan	Weissmann, P G & M C	1, BERKSHIRE RD, FORRESTFIELD	25/11/2002	25/11/2012
GWL 000151772 (001)	3000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Rogan, Brett Norman	72, MULBERRY CT, MAIDA VALE	6/01/2003	6/01/2013
GWL 000151786 (001)	2000	Perth	Shire of Swan South	Perth - Superficial Swan	Watson, Debbie	508, NIRIMBA CL, SOUTH GUILDFORD	7/01/2003	6/01/2013
GWL 000151796 (002)	3500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Howe & Carter, Richard & Lynette	3, SULTANA RD, FORRESTFIELD	7/07/2005	7/07/2015
GWL 000152091 (002)	3500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Netherway, Trevor Noel	89, STEWART RD, HIGH WYCOMBE	9/09/2010	10/09/2020
GWL 000152097 (001)	4600	Perth	Shire of Kalamunda	Perth - Superficial Swan	Arnold, Jean Winifred	49, MILNER RD, HIGH WYCOMBE	12/02/2003	12/09/2013
GWL 000152099 (002)	3600	Perth	Shire of Kalamunda	Perth - Superficial Swan	Di Renzo, Giustina	5, HAWTIN RD, MAIDA VALE	9/09/2010	10/09/2020
GWL 000152102 (001)	30000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Forrestfield Bible	525, BERKSHIRE RD, FORRESTFIELD	28/02/2003	20/01/2013

GWL 000152180 (003)	5000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Fellowship Disisto, Michael; Disisto, Lilliana	4, SULTANA RD, FORRESTFIELD	2/09/2010	1/09/2020
GWL 000152215 (001)	23120	Perth	Shire of Kalamunda	Perth - Superficial Swan	Fagnani, Antonio (Tony)	1, MILNER RD, HIGH WYCOMBE	28/02/2003	12/09/2013
GWL 000152244 (004)	25725	Perth	Shire of Swan South	Perth - Superficial Swan	Guildford Grammar School Inc	191, GREAT EASTERN HWY, GUILDFORD	30/03/2010	11/11/2017
GWL 000152515 (001)	9000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Furfaro, M & A	415, PLOVER RD, HIGH WYCOMBE	25/03/2003	14/09/2013
GWL 000152680 (003)	27750	Perth	Shire of Swan South	Perth - Superficial Swan	Di Giuseppe, Antonio Giuseppe	147, TALBOT RD, HAZELMERE	8/11/2005	14/09/2015
GWL 000152817 (002)	4400	Perth	Shire of Kalamunda	Perth - Superficial Swan	Lush, Leonard James	26, BREWER RD, MAIDA VALE	9/09/2010	10/09/2020
GWL 000152906 (002)	80000	Perth	Shire of Swan South	Perth - Superficial Swan	BGC (Australia) Pty Ltd	80, BUSHMEAD RD, HAZELMERE	13/04/2005	15/04/2015
GWL 000153123 (001)	11450	Perth	Shire of Kalamunda	Perth - Superficial Swan	Ozanne, R.W. & J	1, RIDGE HILL RD, MAIDA VALE	12/06/2003	12/09/2013
GWL 000153231 (001)	7250	Perth	Shire of Kalamunda	Perth - Superficial Swan	Porges, Bruce	105, OXFORD CT, MAIDA VALE	21/05/2003	24/05/2013
GWL 000153592 (002)	6400	Perth	Shire of Kalamunda	Perth - Superficial Swan	Miles, Peter Leslie	82, BRAE RD, HIGH WYCOMBE	15/09/2010	15/09/2020
GWL 000153624 (001)	12000	Perth	Perth South Confined	Perth - Leederville.	Metalic Investments Pty Ltd	134, GREAT NORTHERN HWY, MIDDLE SWAN	10/07/2003	21/03/2013
GWL 000153641 (001)	13950	Perth	Shire of Swan South	Perth - Superficial Swan	Wilcox, Sidney Alexander; Wilcox, Lynley Jane	15, STIRLING CR, HAZELMERE	29/08/2003	31/12/2013
GWL 000153785 (002)	3375	Perth	Shire of Kalamunda	Perth - Superficial Swan	Leisure Time Pty Ltd	10, MAIDA VALE RD, HIGH WYCOMBE	1/09/2010	1/09/2012
GWL 000153812 (001)	5400	Perth	Shire of Kalamunda	Perth - Superficial Swan	TTN Pty Ltd	11, KALAMUNDA RD, HIGH WYCOMBE	23/07/2003	6/10/2012
GWL 000153889 (002)	10000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Forrestfield Christian School	22, HAWTIN RD, FORRESTFIELD	30/03/2010	14/09/2013
GWL 000154050 (001)	4800	Perth	Shire of Kalamunda	Perth - Superficial Swan	Mattar, Shafik Ahmad	91, STEWART RD, HIGH WYCOMBE	25/08/2003	3/11/2013
GWL 000154091 (001)	4250	Perth	Shire of Kalamunda	Perth - Superficial Swan	Halse, O D	106, SADLER DR, GOOSEBERRY HILL	16/10/2003	25/10/2013
GWL 000154118 (001)	3750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Hampson, William	11, SULTANA RD, FORRESTFIELD	23/09/2003	22/09/2013
GWL 000154241 (001)	250	Perth	Perth South Confined	Perth - Leederville.	Swick, Rosanne	5, RIVER BANK BVD, SOUTH GUILDFORD	30/09/2003	24/09/2013
GWL 000154518 (001)	4000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Bennett, Stephen	8, BRUCE RD, MAIDA VALE	21/01/2004	19/01/2014
GWL 000154520 (001)	7740	Perth	Shire of Kalamunda	Perth - Superficial Swan	Avery, Vernon Bruce	50, MILNER RD, HIGH WYCOMBE	20/01/2004	19/01/2014
GWL 000154669 (001)	3500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Patterson, N J	4, BRAND RD, HIGH WYCOMBE	6/01/2004	6/01/2014
GWL 000154688 (003)	4000	Perth	Shire of Swan South	Perth - Superficial Swan	Racing and Wagering Western Australia	22, Kalamunda Road, Guildford	15/06/2009	15/06/2019
GWL 000155224 (002)	100000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Western Australian Fire Brigades Board	10261, DUNDAS RD, FORRESTFIELD	20/05/2010	25/03/2014
GWL 000155295 (003)	198225	Perth	Shire of Swan South	Perth - Superficial Swan	Department of Education	14189, ARCHER ST, WOODBRIDGE	16/08/2007	16/08/2017
GWL 000155295 (003)	198225	Perth	Shire of Swan South	Perth - Superficial Swan	Department of Education	7526, CROSBIE RD, WOODBRIDGE	16/08/2007	16/08/2017

GWL 000155295 (003)	198225	Perth	Shire of Swan South	Perth - Superficial Swan	Department of Education	6318, CLAYTON ST, KOONGAMIA	16/08/2007	16/08/2017
GWL 000155295 (003)	198225	Perth	Shire of Swan South	Perth - Superficial Swan	Department of Education	Crown reserve 8804; Swan Location 10355- Clayton Street Bellevue	16/08/2007	16/08/2017
GWL 000155429 (004)	162750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Department of Education	8558, KALAMUNDA RD, MAIDA VALE	15/02/2012	28/02/2022
GWL 000155429 (004)	162750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Department of Education	12500, NEWBURN RD, HIGH WYCOMBE	15/02/2012	28/02/2022
GWL 000155429 (004)	162750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Department of Education	9109, BERKSHIRE RD, FORRESTFIELD	15/02/2012	28/02/2022
GWL 000155429 (004)	162750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Department of Education	9101, BOUGAINVILLEA AV, FORRESTFIELD	15/02/2012	28/02/2022
GWL 000155448 (005)	376875	Perth	Perth South Confined	Perth - Leederville.	Department of Education	11688, WELLATON ST, MIDVALE	21/02/2012	28/02/2022
GWL 000155694 (001)	7625	Perth	Shire of Kalamunda	Perth - Superficial Swan	Noske, Jeffrey John	3, BRAND RD, HIGH WYCOMBE	25/05/2004	20/05/2014
GWL 000155696 (001)	2500	Perth	Shire of Kalamunda	Perth - Superficial Swan	De Haan, David; De Haan, Chrystine	5, SULTANA RD, FORRESTFIELD	26/05/2004	21/05/2014
GWL 000156446 (005)	19000	Perth	Shire of Swan South	Perth - Superficial Swan	Brighton, Anthony		23/02/2012	23/02/2022
GWL 000156453 (001)	10300	Perth	Perth South Confined	Perth - Leederville.	Shire of Kalamunda		19/07/2005	20/07/2015
GWL 000156772 (003)	103875	Perth	Perth South Confined	Perth - Leederville.	Guildford Grammar School Inc	191, GREAT EASTERN HWY, GUILDFORD	30/03/2010	11/12/2017
GWL 000157266 (002)	15000	Perth	Shire of Mundaring	Perth - Superficial Swan	Shire of Mundaring	123, GREAT EASTERN HWY, MIDVALE	22/06/2007	22/06/2017
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11583, KALAMUNDA RD, MAIDA VALE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	9462, MARKHAM RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	10427, SADDLEBACK CIR, MAIDA VALE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	14651, BENSON WY, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	13987, FRUIT TREE CR, FORRESTFIELD	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11887, WITTENOOM RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	13211, TREE FERN GRN, MAIDA VALE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	7945, WITTENOOM RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	15426, BOWDEN DR, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11072, NEWBURN RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	570, NEWBURN RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	15430, FRUIT TREE CR, FORRESTFIELD	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	15405, WARDA CR, FORRESTFIELD	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	601, HAWKEVALE RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	10295, DAWSON AV, FORRESTFIELD	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11104, KOOKABURRA CR, HIGH WYCOMBE	3/02/2012	20/07/2015

GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	8295, NETHERWOOD RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	8927, BANDALONG WY, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11956, WORRELL AV, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11891, WYCOMBE RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	33, AGRAULIA CT, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	11856, O'CONNELL WY, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	28, SWAN RD, HIGH WYCOMBE	3/02/2012	20/07/2015
GWL 000158077 (005)	893275	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	10430, AKEBIA WY, FORRESTFIELD	3/02/2012	20/07/2015
GWL 000158261 (002)	100500	Perth	Perth South Confined	Perth - Leederville.	Shire of Mundaring	85, STANHOPE GDNS, MIDVALE	8/12/2010	31/07/2012
GWL 000158261 (002)	100500	Perth	Perth South Confined	Perth - Leederville.	Shire of Mundaring	49, MUROS PL, MIDVALE	8/12/2010	31/07/2012
GWL 000159033 (003)	45300	Perth	Perth South Confined	Perth - Leederville.	Midland Redevelopment Authority		12/04/2011	31/12/2014
GWL 000159397 (002)	12408	Perth	Shire of Kalamunda	Perth - Superficial Swan	Mitchell, Maxwell John	22, BRUCE RD, MAIDA VALE	1/11/2007	1/11/2017
GWL 000159502 (003)	49900	Perth	Shire of Kalamunda	Perth - Superficial Swan	Hillview Lifestyle Village Pty Ltd		16/03/2010	16/03/2020
GWL 000161194 (001)	8000	Perth	Perth South Confined	Perth - Leederville.	Guildford Grammar School Inc	24, TERRACE RD, GUILDFORD	3/07/2006	13/12/2014
GWL 000161669 (003)	35250	Perth	Shire of Swan South	Perth - Superficial Swan	Domain Project Development PTY LTD; Guilford Grammer School Foundation Inc.	51, WEST PDE, SOUTH GUILDFORD	20/05/2010	12/02/2019
GWL 000162380 (003)	2325	Perth	Shire of Mundaring	Perth - Superficial Swan	Shire of Mundaring	207, HELENA VALLEY RD, HELENA VALLEY	30/03/2010	22/12/2018
GWL 000163872 (002)	2024	Perth	Shire of Kalamunda	Perth - Superficial Swan	Riley, Craig; Riley, Helen	111, SULTANA RD, MAIDA VALE	12/10/2009	12/10/2019
GWL 000164988 (003)	8700	Perth	Shire of Swan South	Perth - Superficial Swan	Rando, Stephen		26/11/2009	26/11/2019
GWL 000167016 (001)	7280	Perth	Shire of Kalamunda	Perth - Superficial Swan	Peters, Jennifer Ann	92, MILNER RD, HIGH WYCOMBE	17/10/2008	17/10/2018
GWL 000167041 (001)	3750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	28, NOTTINGHAM GRN, HIGH WYCOMBE	17/10/2008	17/10/2018
GWL 000167337 (003)	11250	Perth	Perth South Confined	Perth - Leederville.	Shire of Mundaring	231, HELENA VALLEY RD, HELENA VALLEY	8/12/2011	2/11/2018
GWL 000167785 (001)	3000	Perth	Shire of Kalamunda	Perth - Superficial Swan	Andric, Ruzica	220, NARDINE CL, FORRESTFIELD	30/10/2008	30/10/2018
GWL 000167798 (001)	3740	Perth	Shire of Kalamunda	Perth - Superficial Swan	Miles, Peter Leslie	82, BRAE RD, HIGH WYCOMBE	16/04/2009	16/04/2019
GWL 000167932 (002)	1200	Perth	Shire of Kalamunda	Perth - Superficial Swan	Littlefield Development Pty Ltd	4, LITTLEFIELD RD, HIGH WYCOMBE	21/04/2010	19/02/2019
GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	98, HARPER ST, WOODBRIDGE	30/06/2011	30/06/2016
GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	144, HELENA ST, GUILDFORD	30/06/2011	30/06/2016
GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	9803, MORRISON RD, SWAN VIEW	30/06/2011	30/06/2016



GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	52, MORRISON RD, MIDLAND	30/06/2011	30/06/2016
GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	10174, GRAY DR, MIDVALE	30/06/2011	30/06/2016
GWL 000168139 (002)	280775	Perth	Perth South Confined	Perth - Leederville.	City of Swan	13421, EDDIE BARRON DR, MIDDLE SWAN	30/06/2011	30/06/2016
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	9963, WEST PDE, HAZELMERE	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	149, JAMES ST, GUILDFORD	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	4616, FORD ST, WOODBRIDGE	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan		13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	14641, FERGUSON ST, MIDLAND	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	266, CHARLES ST, MIDLAND	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	12224, WATERHALL RD, SOUTH GUILDFORD	13/05/2010	31/05/2012
GWL 000168263 (002)	217225	Perth	Shire of Swan South	Perth - Superficial Swan	City of Swan	10627, JOHN ST, MIDLAND	13/05/2010	31/05/2012
GWL 000168473 (001)	900	Perth	Shire of Kalamunda	Perth - Superficial Swan	O'Reilly, Peter Hamilton	32, HAWTIN RD, MAIDA VALE	28/07/2009	28/07/2019
GWL 000168841 (002)	15875	Perth	Shire of Swan South	Perth - Superficial Swan	Metropolitan Cemeteries Board		21/04/2010	11/11/2017
GWL 000169011 (003)	12750	Perth	Shire of Kalamunda	Perth - Superficial Swan	Sunstyle Holdings Pty Ltd	15401, ELMORE WY, HIGH WYCOMBE	10/09/2010	9/09/2012
GWL 000169609 (001)	2850	Perth	Shire of Mundaring	Combined - Fractured Rock West - Fractured Rock	Tiong, Mohamad	19, SAMSON PL, HELENA VALLEY	20/01/2010	19/01/2020
GWL 000170338 (001)	8500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Quaker Oats Australia Pty Ltd	3, DUNDAS RD, FORRESTFIELD	3/03/2010	3/03/2020
GWL 000170681 (001)	30000	Perth	Shire of Mundaring	Combined - Fractured Rock West - Fractured Rock	Helena Valley Residential Resort Pty Ltd	237, HELENA VALLEY RD, HELENA VALLEY	20/10/2010	20/10/2020
GWL 000170758 (001)	3375	Perth	Shire of Kalamunda	Perth - Superficial Swan	Mulligan Nominees Pty Ltd	500, ABERNETHY RD, HIGH WYCOMBE	10/06/2010	10/06/2020
GWL 000171656 (001)	13500	Perth	Shire of Mundaring	Perth - Superficial Swan	Hemsley, Jeffrey	1, HELENA VALLEY RD, HELENA VALLEY	28/07/2010	28/07/2015
GWL 000172101 (001)	160500	Perth	Shire of Swan South	Perth - Superficial Swan	Gatti Investments Pty Ltd	9000, WEST PDE, SOUTH GUILDFORD	20/10/2010	20/10/2020
GWL 000172128 (002)	19500	Perth	Shire of Mundaring	Combined - Fractured Rock West - Fractured Rock	Department of Education	6714, INNAMINCKA RD, GREENMOUNT	21/02/2012	28/02/2022
GWL 000172312 (001)	13500	Perth	Shire of Kalamunda	Perth - Superficial Swan	Tyler, Donald	534, BERKSHIRE RD, FORRESTFIELD	30/11/2010	30/11/2020
GWL 000172423 (001)	96800	Perth	Perth South Confined	Perth - Leederville.	Macmahon Contractors Pty Ltd		4/01/2011	7/01/2013
GWL 000172427 (001)	9175	Perth	Shire of Mundaring	Combined - Fractured Rock West - Fractured Rock	ROMAN CATHOLIC ARCHBISHOP OF PERTH	200, INNAMINCKA RD, GREENMOUNT	2/12/2010	2/12/2020
GWL 000173475 (001)	15340	Perth	Shire of Mundaring	Perth - Superficial Swan	Whitehouse Nominees Pty Ltd	203, HELENA VALLEY RD, HELENA VALLEY	22/06/2011	22/06/2021
GWL 000174323 (001)	5200	Perth	Shire of Kalamunda	Perth - Superficial Swan	Shire of Kalamunda	527, BERKSHIRE RD, FORRESTFIELD	13/01/2012	13/01/2014